National Institute of Environmental Health Sciences
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Hosted by:
University of Washington
Center for Ecogenetics and Environmental Health
Seattle, WA

Poster Abstracts

Community-Campus Partnerships for Health

Community-Campus Partnerships for Health (CCPH) is a nonprofit organization that promotes health through partnerships between communities and higher educational institutions. Founded in 1996, we are a growing a network of over 1000 communities and campuses. CCPH has members throughout the United States and increasingly the world who are collaborating to promote health through service-learning, community-based research, community service and other partnership strategies. These partnerships are powerful tools for improving health professional education, civic responsibility and the overall health of communities.

We are working toward a number of shared goals, including:

- Building the capacity of communities and higher educational institutions to engage each other as partners
- Incorporating service-learning into the education of all health professionals
- Recognizing and rewarding community-based teaching, research and service
- Developing partnerships that balance power and share resources among partners

Call for Proposals now available!
Submission Deadline is October 25, 2002 for CCPH's 7th annual conference, *Taking Partnerships to a New Level: Achieving Outcomes, Sustaining Change*, April 26-29, 2003 in San Diego, CA.
Dr. David Satcher, former US Surgeon General will be the opening keynote speaker.
The conference will feature a symposium co-sponsored with the US Department of Housing and Urban Development's Office of University Partnerships and the Community Outreach Partnership Centers Program. Click here for more details.

Enhancing Environmental Health in Nursing Practice and Education to Promote Public Health.
NIEHS Kresge Center for Environmental Health Science

From the earlier times when Florence Nightingale held the position that the environment was a fundamental cause of suffering and disease, there have been many changes, The nurse who used to work close to the environment patients experienced in their homes, workplaces, and community, now is often in a health care facility quite remove from an opportunity to observe patients in their everyday environment. However, nurses and other health care professionals are being asked more frequently to provide information and counsel on the identification and reduction of the health risks associated with environmental exposures. Surveys of undergraduate nursing education report that 56% of the programs spend three to six contact hours on environmental health, whereas in graduate nursing education 62% of the programs reported that the curriculum spent four or fewer hours in environmental health education. Surveys of practicing registered nurses report nurses feel poorly prepared to recognize and intervene in illness that may have an environmental etiology.

Stephanie Chalupka, a Visiting Scholar in the Outreach Program at the NIEHS Kresge Center has, both individually and in the context of a cooperative agreement, created new curricula at the undergraduate, graduate, and practicing nurse levels. These new curricula are based on the Environmental Health Competencies developed by the Institute of Medicine, and are being disseminated in a train-the-trainer model in multiple sites across the U.S.

This project, jointly undertaken by Stephanie with mentoring support from the Harvard School of Public Health, Agency for Toxic Substances and Disease Registry, and the American Association of Occupational Health Nurses, is designed to build the capacity in registered nurses to conduct environmental health education activities and to increase the knowledge and number of nurses prepared to recognize and respond to environmental health hazards and illnesses as well as engage in primary, secondary, and tertiary level prevention activities.

COEP Meeting at Center Director's Meeting 2002

Summary of MIT Poster

The MIT COEP program has been concerned for many years with developing curriculum material in environmental health and science for K-12 and their teachers. The MIT poster describes some of the recent activities of COEP in this area. One highlighted activity is "Grungy Groundwater" for grades 5-8. "Grungy Groundwater" is a hands-on activity that allows students to use experiments to explore how contaminants move through soil systems and pollute surface and ground waters. Another is the "Teachers as Scholars" program, which the MIT COEP uses to teach Teachers about how pollutants move through water bodies. A third is our recently published curriculum package that takes students through the steps followed from site discovery to remediation of a contaminated site. The activities within the package are aligned with the National Curriculum Standards, and lesson preparation for teachers is included in the package. Finally, the poster describes some of our projects in development. One of these is "Environmental Detectives" a palm-pilot based game that has students playing detective to locate the source of a potential carcinogen. Another is our new activity that uses Lego to help explain the mysteries of DNA to young and inquiring minds.

Center for Membrane Toxicity Studies, MDI Biological Laboratory (Salisbury Cove, Maine)

How to grow a scientist: Community-based organizations and student research internships at the Mount Desert Island Biological Laboratory

The Center for Membrane Toxicity Studies promotes large and active community outreach and educational programs (COEP) based on the research and scientific findings of the work accomplished in conjunction with the Center. The Program Goals are:

- to broadly translate Center research findings into knowledge which can be applied to public health;
- to reach as many people, first locally, then nationally, as possible;
- to promote the use of unique marine models in environmental health science research
- to educate young people in environmental health science and inspire them towards a career in the discipline.

The major components of the COEP are:
1) Education, including a federally and locally funded mentoring program for high school and undergraduate students interested in environmental science and laboratory research; two one week intensive pedagogical experience (IPE) courses in laboratory research for first year medical students from Yale and the University of Pittsburgh Schools of Medicine; a three day physiology and marine biology course (prerequisite to the mentoring programs) for high school interns; a variety of informal training activities of undergraduate and graduate students who perform the analytic functions of the laboratory such as isotope counting, tissue culture management, and using flame and atomic absorption spectrophotometry;

2) Community outreach, encompassing weekly public tours at the Myers Marine Aquarium; off campus invited lectures by CMTS personnel ; working with local grassroots organizations such as the Mount Desert Island Water Quality Coalition and Frenchman Bay Conservancy to use Center findings to partner with the public at large to understand the biological sequelae of pollution and the need and methods to prevent it.

3) Information services, including a biyearly Laboratory/Center newsletter, an Annual Report, an Annual Bulletin presenting Center research reports, many articles on Center activities and research breakthroughs in the local newspapers, radio and television interviews and stories, and two websites displaying information from and about CMTS.

4) The Community Environmental Health Laboratory in the CMTS at MDIBL. The CEHL provides year round laboratory space at MDIBL for water quality-related environmental health research projects undertaken by local students and community members, training for local K-12 science teachers, training for community volunteers, a field station/lab space for classroom teachers and their students during the academic year, and a clearinghouse of information available to community members.

ABSTRACT

COMMUNITY OUTREACH REGARDING THE ENVIRONMENTAL HEALTH IMPACTS OF THE WORLD TRADE CENTER

G. Thurston and L. Schuetz
NYU-NIEHS Environmental Health Sciences Center
New York University School of Medicine

In the wake of the catastrophic attack on the World Trade Center on September 11th, there was much fear and concern on the part of the public regarding the potential environmental health impacts of the pollution resulting from the WTC collapse and fires. There was much distrust of government pronouncements of safety, so the goal of our COEP in this case was to make the scientific information and resources of our Center available to the public so as to address their concerns. Multiple avenues were pursued in this effort, including through the media, community forums, and a community newsletter.

Media interactions were instrumental in defining the way in which capturing and reporting much of the research being conducted by the various NIEHS centers. Our researchers made themselves available to the press in all formats to help answer their questions for the public. This included nationwide TV interviews on CBS Nightly News and CNN, as well as radio interviews (e.g., on NPR's Morning Edition and Democracy Now). In addition, multiple interviews were conducted with members of the print media. A variety of newspaper and magazine articles are displayed in this poster that contain cogent quotes from researchers that have been involved in WTC related research and community outreach.

Community forums served as a venue for prominent NIEHS-funded researchers to address the public about the potential environmental risks and future plans outlined for WTC research. NYU has held two community forums to date. The initial forum was held last October to answer the public's questions. A follow-up forum held one year later allowed researchers to let the public know what results have been obtained, studies being conducted, in addition to giving the public a voice by encouraging them to ask questions and express their concerns.

A comprehensive newsletter embodying current NIEHS Center investigations, in addition to practical tips for residents to use, is also displayed on our poster. It has been widely distributed in the lower New York City downtown area and at WTC meetings. This project was a collaborative effort with University of Rochester Environmental Health Sciences Center. A downloadable electronic version of this WTC Environmental Health Research Newsletter is also posted on our website: http://niem.med.nyu.edu/.

Community Outreach & Education Program
Environmental Health Sciences Center and Marine/Freshwater Biomedical Sciences Center at Oregon State University

OSU is home to two National Institute of Environmental Health Sciences Centers: the Environmental Health Sciences (EHS) and the Marine/Freshwater Biomedical Sciences (MFBS) Center. The Centers focus on collaborative, interdisciplinary research to determine how environmental chemicals and other agents may be toxic to humans. Specific research conducted by EHS Center investigators helps provide a scientific basis for the prediction of human health risks from exposure to both natural and synthetic environmental chemicals.

In addition to scientific research, the EHS and MFBS Centers use their Community Outreach and Education Programs (COEP) to increase the public's ability to understand and make informed decisions on issues relevant to the role of environmental factors in human health and disease. The COEPs also strive to develop an understanding among the public of environmental health science research and its importance in assessing human health risks. Through community outreach and education, the Centers also increase the public's awareness of the resources of the NIEHS in general and the EHS Center at Oregon State University (OSU), specifically. To achieve these goals, the COEP enlists expertise of EHS and MFBS Center investigators and actively collaborates with existing outreach programs, university programs, community organizations, and other NIEHS Center COEPs. The EHS and MFBS Center COEPs serve the Corvallis community, the state of Oregon, and regional and national audiences. Within the OSU community, the EHS and MFBS Center COEPs are recognized as a resource to offer programs in environmental health science, and COEP does this through many outreach mechanisms including informal and formal education programming, partnerships with science centers/museums, interactions with the media and community outreach events.

Learning through Environmental Health Science Scenarios: the Hydroville Curriculum Project

COEP is entering the third year of the Hydroville Curriculum Project (HCP), a seven year "Environmental Health Sciences as an Integrative Context for Learning (EHSIC)" grant from NIEHS dedicated to dramatically improving the science education and environmental health knowledge of high school students. To date, two of four environmental health science scenarios, the *Pesticide Spill Scen*ario and *Mysterious Illness Outbreak*, have been revised, edited, and enhanced for use by Oregon schools, and the development of a third curriculum about indoor air quality is underway.

2001-02 Project Benchmarks:

- Published the *Pesticide Spill Scenario* for dissemination. We will train seven NIEHS COEPs in the use of the *Pesticide Spill Scenario* in December 2002 at the Environmental and Occupational Health Sciences Institute in Piscataway, New Jersey.
- Adapted and enhanced the Hydroville *Mysterious Illness Outbreak* challenge problem into an integrated classroom module, incorporating additional scientific, math, language arts, and humanities content.
- Aligned the *Mysterious Illness Outbreak* challenge problem with Oregon and national educational standards.
- Hosted a Teacher Summer Institute and trained 10 teams of teachers (34 total) in environmental health science, team teaching, problem based learning, and implementation of the challenge problem module.
- Developed evaluation tools to address the impact of the curriculum and teaching methods on student achievement and attitudes toward science, risk, and environmental problem solving.
- Introduced the *Mysterious Illness Outbreak* challenge problem into 11 SMILE Program after-school

clubs and 6 pilot schools with over 1200 participating 9th, 10th, and 11th grade students.
- Convened a science advisory board made up of EHS Center investigators and OSU faculty to advise HCP on the goals and content of the *Indoor Air Quality* scenario.

Featured student activities:

(1) **Microplate Acetylcholinesterase Protocol**: The MFBS Center COEP created a spectrophotometric microplate acetylcholinesterase protocol for use by high school students participating in the Hydroville Curriculum Project. This method was adapted from OSU research investigating AChE inhibition dose-response to chlorpyrifos in Pacific Steelhead in northwest agricultural streams. In classroom use, students, as analytical toxicologists, used spectrophotometry to determine amount of free acetylcholinesterase (AChE) present in vertebrate tissues as an indicator of exposure to organophosphate pesticide exposure from "samples" collected from Hydroville residents. To prepare for their role in the Mysterious Illness Outbreak scenario students studied enzymes, nerve impulse transmission, pesticide toxicity, and signs/symptoms of organophosphate exposure.

(2) **Blood Count Analysis using Flow Cytometry**: The EHS Center COEP created an activity for students using flow cytometry data to analyze the frequency of white blood cell types from fictitious Hydroville residents to look for the presence of bacterial or viral infection or exposure to organophosphate pesticide. Students prepared for their role as expert medical clinicians by studying blood cell types and hemopathology, and by making and analyzing blood smears.

Toxicology and Risk Assessment & Pollution (ToxRAP™) Teacher Training Workshops

COEP is continuing to offer professional development opportunities for teachers and to disseminate the early elementary, intermediate elementary, and middle school modules of the ToxRAP™ (Toxicology, Risk Assessment and Pollution) curriculum as part of Environmental Health Sciences Training and Education Program (EH-STEP). In 2001-02 COEP trained 61 teachers to use the ToxRAP curriculum in their classrooms. COEP continues its collaboration with the Oregon Museum of Science and Industry (OMSI) Teacher Education Program and is offering five ToxRAP train the trainer workshops for Oregon teachers in 2002-03.

ENVIROMENTAL HEALTH SCIENCE TRAINING OF PROMOTRAS AND HEALTH CARE PROFESSIONALS ALONG THE TEXAS-MEXICO BORDER

The Community Outreach and Education Program (COEP) of the Center for Environmental and Rural Health (CERH) at Texas A&M University is primarily a program focused on rural environmental health education of Promotoras (community health educators), health care professionals, and K-12 teachers and students.

As part of the Promotora educational program, health workers are trained by Center scientists on how to reduce environmental exposures associated with human illness with the goal that they pass this knowledge to residents in their own communities (i.e. colonias) along the Texas-Mexico border. A cornerstone of this program is the bilingual, culturally appropriate environmental health science curriculum rooted on a "Train the Trainer" model of education and outreach. Its greatest strength is the direct participation of Promotoras and colonia residents. As educators, Promotoras helped refine the education/outreach program for expansion to other colonias along the border. Based on feedback from residents, our "Train the Trainer" model of education and outreach has been successful.

Ongoing work in the colonias is promoting strong partnerships among colonia residents, community-based organizations, clinicians, public health professionals and researchers. An example of this is our recently funded project sponsored jointly by the Health Resources and Services Administration (HRSA) and the Environmental Protection Agency (EPA). This project has provided the opportunity to collaborate with the Texas Department of Health Region 11 to educate not only Promotoras, but also health care professionals in Texas. The major environmental health focus of this project is drinking water safety. Emphasis is given to the prevention, control, and report of reportable and non-reportable water related illnesses in Hidalgo County, Texas. Cultivation of these partnerships will leave a legacy of disease prevention, behavior modification, and health promotion related to the environment in this region of the State of Texas.

The K-12 educational program is also focused on rural environmental health. The Partnership for Environmental and Rural Health (PEER) is a NIEHS-funded collaboration between the Colleges of Veterinary Medicine and Education, the Texas Rural Systemic Initiative and the CERH. PEER has been designed to encourage teachers in rural settings to use environmental health science topics across all core subject fields to motivate students, and especially to help them relate science instruction to the real world. To achieve its objectives, PEER focuses on an educational approach that includes development of on-line multimedia curricula aligned with the Texas Essentials Knowledge and Skills standards, professional developmental programs for teachers, and interactions between environmental health scientist and public school students.

Abstract for the poster for the 2002 COEP Director's Meeting

The Southwest Environmental Health Sciences Center (SWEHSC) COEP is developing a digital library to efficiently disseminate the environmental health and toxicology resources developed by the COEP and SWEHSC investigators. The digital library, called Resources for Environmental Health Studies (REHS), is "a managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network"[1].

The focus of REHS is to provide resources and curricula to assist teachers with integrating environmental health into science and other academic subjects like English, social studies, and math. REHS's interactive design allows users to access hundreds of teaching resources developed or supported by SWEHSC. These resources include both new and pre-existing environmental health/environmental science lessons, background information materials for students and teachers, and student handouts. Patrons access information by browsing titles, topics, and types of resources or they locate materials by simple and advanced searches. This active approach is more user friendly than less dynamic web sites and takes materials management and curricula dissemination to the next level.

Additional services provided by REHS include a glossary, suggestions about locating and using Internet resources, an ability for users to suggest materials to the library, the capability for patrons to email questions to SWEHSC and the COEP, and a reference section, which will have links to other online resources of benefit to the users of the library.

The poster provides additional details about REHS, why and how it is being developed, and identifies the people and programs involved in its creation. An initial version of this digital library can be accessed online at http://swehsc.pharmacy.arizona.edu/coep/rehs/index.html.

Abstract

NUTRI-LINK – AN AFTERSCHOOL COMMUNITY NUTRITION EDUCATION PROGRAM

Jo Ann Johnson, MPH, Patricia Wakimoto DrPH, R.D., Lucrecia Farfan-Ramirez, MPH, University of California Cooperative Extension, Alameda County, NIEHS Berkeley Center Community Outreach and Education Program (COEP)

Interactive computer-mediated technology, which incorporates stand-alone computer applications and on-line services, is a viable means of disseminating science based youth nutrition information. Although a wealth of current scientific based nutrition activities developed for youth on-line exists no nutrition education programs have integrated or applied these resources to promote disease prevention in behavior–focused nutrition education programs. In addition, an increasing digital divide in low-income communities is occurring. In an effort to close this technology gap and provide culturally relevant nutrition education that leads to community-based health promotion, University of California Cooperative Extension in Alameda County in collaboration with the NIEHS Berkeley Center COEP designed, developed, piloted tested and evaluated a nutrition education program to integrate computer technology and nutritional science into a constructive interactive service-learning afterschool nutrition curriculum for youth ages 8 - 13. Utilizing the theoretical foundations of the UC Links 5th Dimension educational framework and the experiential learning model, *Nutri-Link* incorporates six thematic nutrition topics with on-line nutrition resources where youth interact closely with an undergraduate student peer mentor in a variety of engaging technology-mediated learning activities designed to promote nutrition in an informal, playful atmosphere and encourage youths transfer of nutrition knowledge into practice. The delivery of the program is measured and monitored using process evaluation where mentor journals and youth activity cards track outcome objectives. A pre and post knowledge based survey is used to evaluate youths degree of nutrition knowledge and application into real life experiences, as well as a computer survey to assess computer use and access. Context evaluation is integrated into program planning.

This research project was funded by the UC Office of the President Outreach Pister Funds and the NIEHS Berkeley Center COEP.

University of Medicine and Dentistry of New Jersey and
Rutgers, The State University of New Jersey
Center for Environmental Health Sciences (Grant No. P30 ES05022)
National Institute of Environmental Health Sciences (NIEHS)
Center of Excellence

The Community Outreach and Education Program (COEP) at the NIEHS Center of Excellence located at the Environmental and Occupational Health Sciences Institute (EOHSI) is jointly sponsored by the University of Medicine and Dentistry of New Jersey (UMDNJ)-Robert Wood Johnson Medical School and Rutgers, The State University of New Jersey. COEP, in conjunction with the UMDNJ-School of Public Health, is managing EH-STEP (Environmental Health Sciences Training and Education Program), a nationwide K-12 educational initiative supported by the National Center for Research Resources under the Science Education Partnership Award Program (Grant No.R25 RR15621). Through this project, COEPs at eight NIEHS Centers of Excellence are collaborating to enable students to improve their basic science and math skills while learning to reduce their exposure to potential pollutants and possibly prevent environment-related diseases and illnesses. To date, the EH-STEP COEPs have trained 1,614 K-12 teachers, impacting approximately 32,280 students. It is expected that 800 teachers will be trained in this third and final year of the project, bringing the total of teachers trained in three years to over 2,400, with more than 48,000 students impacted by program materials.

COEPs at Oregon State University, University of Arizona, University of Southern California, University of Texas Medical Branch, University of Wisconsin-Madison, Vanderbilt University and Wayne State University are participating with UMDNJ. Each COEP has established a Regional Education and Training Center (RETC) at its site to provide professional development opportunities for teachers. Program partners also include scientists from these centers and the Toxicology Education Foundation (TEF). This broad-based partnership ensures that the project is translatable nationwide.

A *curriculum dissemination through professional development* model is utilized. This model comprises four main components–EHS curricula, train-the-trainer workshops, teacher trainings and scientist involvement–and expands upon two of EOHSI's successful nationwide programs: the *ToxRAP™ Education and Training Program*, supported by TEF, and the *ToxRAP™ Network* which was a joint program with the University of Arizona and supported by NIEHS. *ToxRAP™*, an award-winning EHS curriculum series developed by EOHSI with support from NIEHS, has served as the initial curriculum for dissemination through EH-STEP. A Curriculum Selection Board (CSB) has identified additional materials/ programs for dissemination. The CSB has chosen curriculum materials developed by Wayne State University, Office of Science Education at the National Institutes of Health, Miami University (OH), Oregon State University, University of Arizona and University of Miami.

RETC teams attend train-the-trainer workshops on implementing the selected curricula, as well as designing and delivering effective teacher training programs. Each RETC is responsible for providing trainings and curricula to K-12 teachers in its region. A Scientist Involvement Advisory Board is developing strategies for scientists to interact with teachers/students and to encourage students to pursue careers in biomedical and behavioral sciences research. Ongoing support is provided through Internet-based technologies. Formative and summative measures are used to analyze project effectiveness.

UMDNJ
University of Medicine & Dentistry of New Jersey

EOHSI

The State University of New Jersey
RUTGERS

EDUCATIONAL MATERIALS CONCERNING HARMFUL ALGAL BLOOMS AND THEIR POSSIBLE EFFECTS ON HUMAN HEALTH

Lora E Fleming*, Gayl Van De Bogart*, Wendy B Stephan*, Dominick Squicciarini*, Richard Weisman*#, Barbara Kirkpatrick+, Lorraine Backer**, Richard Clark++.

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The potential interactions between marine and freshwater harmful algal blooms (HABs) and humans are increasing. Humans are potentially exposed through food, drinking water, and recreational and occupational water use to an increasing number of HAB organisms and their toxins. Nevertheless, the amount of clinical and epidemiologic research concerning acute and chronic human health effects from the HAB organisms and their toxins is relatively sparse. At the same time, the public is increasingly aware of and interested in the potential dangers associated with exposure to HABs. Public health authorities and researchers must respond to these public health concerns. The challenge is to developed appropriate educational and outreach materials based on limited scientific data. Educational materials need to be created to inform the public concerning the possible human health effects of HAB organisms, their toxins, and their prevention. Educational materials developed by a group of HAB researchers and public health personnel for general HABs, Florida Red Tide Toxins (brevetoxins), Cyanobacteria, and Ciguatera are discussed, as well as methods for their dissemination.

Poster Abstract

Community Outreach and Education Program, Center for Environmental Health and Susceptibility, University of North Carolina at Chapel Hill

Now in its second year of operation, UNC-CH's COEP's poster focuses on its accomplishments to date and highlights, in particular:

- two community-focused interactive educational modules on ethical, legal and social issues in gene-environmental interactions that were funded by a supplemental grant from NIEHS and produced in collaboration with:
    - two community groups (the Breast Cancer Coalition of North Carolina and the NC Occupational Safety and Health Project)
    - Center, University and NIEHS scientists and ethicists
    - the University of Cincinnati COEP
- the curriculum, "Our Genes, Our Environment, Our Health," that targets high school and middle school teachers and focuses on both scientific and ethical issues and which was presented to teachers in conjunction with the N.Y. Museum of Natural History's exhibit, "The Genomic Revolution" whose second stop on a national tour was at the NC Museum of Natural Sciences

In addition to these two projects, the COEP has sponsored community-based undergraduate internships, investigated the use of science and technological information by policy makers and communities through a Listening Project, focus groups and case studies of other COEPS, and developed the Center's website, newsletter and brochure.

University of Rochester Environmental Health Sciences Center

Dina Markowitz, Ph.D., COEP Director
Katrina Smith Korfmacher, Ph.D., Community Outreach Coordinator

During 2001-2002, we conducted several kinds of community outreach activities: organizing community meetings/forums, and partnering with established community groups.

Community Forums

In April 2001, we hosted Theo Colburn, author of "Our Stolen Future" in a well-attended lecture at the University of Rochester. In October, 2001, we organized a Community Environmental Symposium City of Rochester, focusing on local environmental issues of concern. In December 2001, we partnered with the environmental sciences departments at State University of New York at Brockport and Rochester Institute of Technology to co-host a community lecture by Physicians for Social Responsibility on global warming. We are also participating in a collaborative project with the New York University COEP to provide community forums and newsletters regarding the environmental impact of the World Trade Center disaster.

Community Organizations

We attend and are active members of several community organizations which relate to environmental health. These groups include the Monroe County Environmental Health Advisory Board, The Rochester Lead Free Coalition, and the Water Education Collaborative. We also convene our own EHS Center Community Advisory Board, composed of members of Rochester-area environmental and educational organizations.

Rochester Lead Free Coalition

Several of our EHS Center faculty members, including our new Community Outreach Coordinator, have been extensively involved with the Rochester Lead Free Coalition. The Coalition was formed two years ago to address the persistent problems with lead poisoning in Monroe County. The Coalition consists of medical professionals, government agency staff, housing specialists, community organizations, and concerned citizens. Efforts to combat lead poisoning are focused on the city of Rochester, where several neighborhoods over a third of the children screened for lead have elevations above 10 ug/dL.

In addition to regularly attending Rochester Lead Free Coalition meetings, we have been involved in several specific projects and efforts of the Coalition. First, we have conducted analyses for the Coalition that link medical research, health department statistics, and economic projections to show how much lead poisoning costs society today. These calculations have been particularly valuable to the Coalition as they try to develop political support for addressing lead hazards. Second, we are members of the Governmental Relations subcommittee, which is trying to affect policy at the local, state, and national levels to reduce lead poisoning. As part of these efforts, we have met with the staff of our local Congresswoman, Louise Slaughter, made presentations to the Monroe County Legislature, and worked with the Mayor's office of the City of Rochester, which has committed $5 million over the next three years to remediate lead-hazardous housing. Third, we are actively promoting more direct community involvement with the Coalition. We recently participated in the first of a series of Coalition meeting to be hosted by a neighborhood group and are currently organizing a support group for parents of lead-poisoned groups. We are also working to increase the local media's attention to this issue, particularly with respect to publicizing a recent report by the Center for Governmental Research that documents the extent of lead poisoning in our community.

Poster Abstract: Univ of Southern California/University of California, Los Angeles

Southern California Environmental Health Sciences Center, Los Angeles, CA
Center Director: John Peters, M.D.
"A Breath of Air: What Air Pollution is Doing to Our Children" – a 28-minute documentary video
Executive Producer: Andrea Hricko, MPH, COEP Director

The Children's Health Study (CHS) is a 10-year longitudinal study involving 6000 children from 12 communities in Southern California, directed by Dr. John Peters, Center Director. The 12 communities have differing levels and types of air pollution. The CHS is funded by the California Air Resources Board, with additional support from the National Institute of Environmental Health Sciences and the Hastings Foundation. Numerous Center members are study investigators. The study is nearing completion and more than a dozen scientific papers have already been published. Local and national news media typically feature significant study results as they are released. As the study nears completion, however, it has become clear that many members of the public, as well as policymakers, community-based groups, students and teachers, parents and others do not fully understand the implications of the Children's Health Study. They may know that the CHS shows that "air pollution is bad for children," but often they cannot actually articulate or discuss specific details of the findings. For example, the study shows that children in more polluted communities have slower lung function growth rates and more school absences than children in less polluted communities. And it shows that children who play three or more sports and who live in the more polluted communities have an increased risk of developing asthma compared to children playing sports in the less polluted communities. To better inform the public of these and other study results, the Community Outreach and Education Program of the Center produced a 28-minute documentary video, in partnership with the USC Annenberg School of Journalism. The video features families discussing the impact of air pollution on their children, along with key investigators describing the nature of the study and significance of the results. Also in the video are key government regulators and a representative of a community-based group. Although the video has just been completed, it already has been shown at a statewide meeting of the American Lung Association of California, at a local regulatory conference on air pollution with 200 attendees and in a college classroom. Plans are underway to distribute the documentary to community-based groups, public schools, colleges and universities, churches, health organizations, sports organizations, state legislators, and others. An evaluation plan is being developed, looking not only at how many individuals have viewed the video, but also whether their knowledge of air pollution's health effects on children increased. Funds to produce the documentary were provided by the California Air Resources Board, with salary support for the Executive Producer provided by the NIEHS Center grant. Additional funds are being sought to develop a series of tailored discussion guides to accompany the video. A Spanish-language version is also being developed.

THE COMMUNITY OUTREACH and EDUCATION PROGRAM of
The Center for Research on Environmental Disease
UT MD Anderson Cancer Center, Science Park Research Division,
Smithville, TX

Robin Fuchs-Young, Ph.D. - Director
Bob Chamberlain, Ph.D. - Assoc. Director
Jennifer Gorenstein - Assoc. Director
Don Cook, MS, MPH - Coordinator
Joe Rodriguez - Project Manager

The CRED COEP focuses on K-16 educational programs to inform teachers and students about the basic mechanisms underlying environmental disease. The goal is to provide accurate information that promotes a better understanding of the impact of environmental factors on human health, and encourages students to make more informed, healthier lifestyle decisions. Towards this goal, the CRED COEP develops curricula and enrichments for students, including: Veggie-mon (**www.veggie-mon.org**), a EH&S website for 3rd-8th graders with sections on tobacco avoidance, UV exposure and nutrition, and SCREAM, a CD-ROM based curriculum for high school students that investigates the interaction between environmental factors and genetics in determining cancer risk. Our most recent effort is an online module intended for high school seniors and young adults, that explores the Ethical, Legal and Social Implications (ELSI) of advancing genomic technologies. To encourage academically talented students to consider careers in biomedical and environmental research, the COEP provides career development seminars for K-12 students and directs a program that provides project-based, bench research experiences for high school students and undergraduates. The CRED COEP is also committed to professional development for teachers in order to improve and expand environmental health and science education in Texas schools. Workshops and inservices at our Center along with seminars at the Conference for the Advancement of Science Teaching (CAST), the annual conference of Heath Science Technology and Education (HSTE) and the Environmental Health Sciences Summer Institute (SI) are part of this effort. Recently, we have initiated a long-term project in collaboration with a Texas Independent School District, the Texas Education Agency (TEA), local waste treatment utilities and nature education facilities and SEER to promote the use of environmental health and science as an integrating context for education. This approach uses environmental health and science to stimulate comprehensive, inquiry-based learning that incorporates all subjects, including natural science, English, social studies, history and mathematics.

THE COMMUNITY OUTREACH AND EDUCATION PROGRAM OF THE CENTER FOR RESEARCH ON ENVIRONMENTAL DISEASE

The Community Outreach and Education Program (COEP) of the Center for Research on Environmental Disease has pursued several critical collaborations and programmatic initiatives during the last year. The COEP continues its primary focus on K-16 educational programs including: curriculum development, teacher training/professional development and student research programs as part of a cohesive program to implement environmental health and science (EH&S) education in central Texas schools.

❖ **K-16 Education Student Programs**

The COEP hosts a Summer Undergraduate Research Program and a High School Summer Research Program, providing bench research opportunities to undergraduates nationwide and local high school students. In 2002, 19 undergraduates and 2 high school students participated in the programs, respectively, making it our largest program ever. The purpose of these research programs is to afford dedicated and academically talented students the opportunity to participate in hands-on hypotheses driven bench research. High school students have the option of working in the summer or during the regular school year through a state sponsored independent study course called Scientific Research & Design. In May, both Smithville High School students received honors at the Combined Texas NIEHS Center High School Bench Tutorials Symposium at UTMB.

❖ **Curriculum Development**

With the recent award of an NIEHS Supplement, the COEP launched an initiative to develop an online education module on the ethical, legal, and social implications (ELSI) of genomic technologies. The purpose of the module is to provide accurate, balanced and relevant content that will stimulate critical thinking and help high school students and teachers make informed decisions about genomic analyses, medical privacy, and participation in clinical research studies. The COEP completed the first phase of the project by convening three expert panels to identify the basic content for the module.

Work is continuing with the CD-Rom based curriculum SCREAM: Student Curriculum Research Education and Assessment Module. SCREAM is designed to teach students about the interactions between genes and environmental factors and determination of risk for environmental disease.

The COEP began an effort to gather data and evaluate the extent to which its environmental health and science education website, Veggie-Mon, (http://www.veggie-mon.org) successfully conveys knowledge about nutrition, sun exposure, and tobacco avoidance to its target audience of 4^{th} to 8^{th} grade students. In April of 2002, the COEP obtained Institutional Review Board approval for a protocol to collect data on student use of the Veggie-Mon site. Students were monitored while visiting the site and questioned on what they learned afterwards. Focus groups of students sought opinion data on whether the site was age-appropriate, enjoyable and accurate. Over time, the COEP will gather data from students in rural, urban and suburban schools, while continuing to update the website with new and exciting educational information.

❖ **Educator Professional Development**

The COEP continues to work toward improving science education and to provide Texas teachers with EH&S education tools by offering workshops at the Conference for the Advancement of Science Teaching (CAST) and the Health Science Technology & Education (HSTE) Conference. SCREAM was also offered at the Environmental Health Sciences Summer Institute, an NIEHS COEP driven collaboration sponsored by the University of Texas Medical Branch at Galveston.

The COEP also offers internships each summer to Texas teachers. This past summer two regional teachers worked in concert with Center scientists to initiate new and continue existing curriculum development projects. Specifically, teachers generated content for a new Veggie-Mon section called Tobacco Road, a tobacco avoidance and risk awareness section introducing the character Igna-Ray-Mouse.

❖ **Future Initiatives**

The COEP initiated a dialogue with Del Valle ISD educators, science center representatives, museum education coordinators, and environmental health scientists for the purpose of implementing environmental health and science (EH&S) as an integrating context (EIC) across the curriculum. Texas recently adopted a more rigorous assessment system, requiring students to retain and apply essential knowledge and skills and to pass the assessment exams prior to advancing to the next grade level. There is concern among educators that with the emphasis on the test, critical thinking and reasoning skills will not be developed. To address this problem, the COEP is advancing the use of EH&S as an integrating context to support development of higher learning and thinking skills in language arts, mathematics, social studies and science. Recently, the COEP facilitated participation of Del Valle teachers in the Texas Strands Conference sponsored by the State Education and Environment Roundtable (SEER) to implement the EIC concept in Texas schools. Del Valle educators have enthusiastically embraced the EIC approach to improve education and this partnership will implement new EH&S curriculum in the coming years.

The Community Outreach and Education Programs of the NIEHS Center in Environmental Toxicology and the Sealy Center in Environmental Health and Medicine

The Community Outreach Programs of the NIEHS Center in Environmental Toxicology & the Sealy Center in Environmental Health & Medicine exist to serve the people of southeast Texas, principally those counties surrounding the Houston Ship Channel. These counties, the most densely populated area of the state, include a significant number of underserved minorities and are the site of the largest petro-chemical refinery complex in the nation. At the University of Texas Medical Branch in Galveston, the universities pivotal geographical location in the region and a critical mass of environmental health science research in DNA repair, asthma pathology, and bio-transformation brought the research center into being. The presence of national center in the region elicited from the community requests for environmental health science information and education; the centers' community outreach and education program COEP was created and organized around the community's requests. The COEP has evolved into a wide-ranging multi-faceted organization that focuses on four general areas: an Environmental Arts and Sciences K-12 Schools Program; a Public Forum and Toxic Assistance Program; Asthma Outreach and Education Program; and a Theatre Outreach and Education Program.

UW Center for Ecogenetics and Environmental Health (CEEH)
Community Outreach and Education Program

Poster Overview:

Two years ago (September 2000), the CEEH hosted a town meeting entitled *Voices for Healthy Environments, Healthy Communities*. This well-attended event gave COEP staff an unprecedented opportunity to build relationships with a broad range of community groups and coalitions. Many of the current CEEH COEP-community partnerships began during the planning process for the town meeting and have been flourishing ever since. These partnerships have led to COEP participation in the Shoalwater Tribe's shellfish management project, the Swinomish Indian Tribe's Seafood advisory board, the Institute for Children's Environmental Health's Advisory Board, and the Health Justice Network coalition. These relationships with community partners ensure that current environmental health science research is available to those involved in community-based decision making. When working with community partners, it is vitally important that COEP staff clearly delineate the resources that the CEEH brings to the table. COEP provides access to environmental health experts, educational materials, and research facilities. Access to the varied resources of an academic research center empowers community and tribal partners to aggressively address environmental health and justice issues.

The poster that will be displayed at the COEP meeting was designed for use at community meetings. It strives to educate non-university partners about the environmental health resources available to them through the CEEH and UW. It has been used at events such as regional environmental justice conferences, statewide environmental health professional meetings, and educational fairs.

University of Wisconsin-Madison
Highlights of the 2002 COEP activities of the Environmental Health Sciences Center for Developmental and Molecular Toxicology
Kevin Niemi, Ph.D., COEP leader

Public outreach

The UW-Madison EHS Center holds an annual research symposium. In conjunction with the symposium, the COEP arranges a related public forum. Themes for the public forum in the past four years included in 1999, Developmental Toxicology and Developmental Biology (primarily for health care personnel); in 2000, Dioxins and PCBs; in 2001, Vitamins and Antioxidants: Benefits and Potential Risks. The 2002 Public Forum was the most successful to date as we drew about 100 public members to it and successfully kicked off our 2002 research symposium on breast cancer.

The Public Forum was titled: The Challenges of Breast Cancer Research: What are the risk factors? How do we learn about them? What is happening on the treatment front? Two UW-Madison researchers presented their research and shared their expertise with the audience. Dr. Patrick Remington is a public health researcher with the UW Department of Population Health Sciences. He covered the research on risk factors and cancer surveillance. Dr. Tara Breslin is a surgical oncologist with the UW Department of Surgery. She talked about current treatments and prevention methods for breast cancer. This two-pronged approach enlightened the audience about both the public health research challenges as well as the surgical and treatment challenges of breast cancer. A full two plus hours of dialogue between the speakers and the audience served as the kickoff for the two-day symposium on breast cancer that began the next day. (See poster for complete details of the history of the Public Forums that are associated with our research symposia)

K-12 outreach

In the summer of 2002 the COEP expanded its teacher professional development offerings in the Environmental Health Sciences. Through partnering with the Wisconsin State Childhood Lead Prevention Program, the COEP was able to offer *Science and Our Homes: Safe and Healthy* for 25 teachers elementary and middle school teachers.

For the past four years the COEP has offered a weeklong *Environmental and Human Health* course for high school science teachers. This one credit UW course routinely draws between 15 and 25 teachers and covers basic environmental health, and cancer biology as well as topics that Center investigators present of their own research. The addition of the elementary and middle school course expands the professional development offerings to the entire K-12 community.

The COEP also ventured into the area of molecular biology and genomics with another partnering effort. A three-day workshop on Wisconsin Fast Plants, a classroom staple, and PCR was offered to high school teachers. An NSF grant to a UW researcher to develop classroom materials supported this offering. Talks to expand the topics covered in the workshop to genomics resulted in the submission of a preproposal of a grant to NSF and discussions with the Deep Green project coordinator funded by NSF. Deep Green is a phylogeny effort to expand our understanding of evolutionary relationships among all organisms. The Deep Green coordinator pledged funds to support a high school teacher's work on the genomics project.

UW-Madison Environmental Health Sciences Center for Developmental and Molecular Toxicology poster abstract:

Since its inception four years ago as an NIEHS Center, the UW-Madison Developmental and Molecular Toxicology Center has organized an annual two-day research symposium. The scientific themes rotate among the three research cores of the Center. In conjunction with the symposia the Center has always tried to engage the public, broadly defined as non-Center investigators, other UW campus members, health care providers, and the public at large through a Public Forum. We will share the successes and lessons learned from these efforts to involve more that Center investigators in our research symposia.

Community Outreach and Education in Environmental Health
Marine and Freshwater Biomedical Sciences Center
University of Wisconsin-Milwaukee

The Center operate four nationally funded programs in its COEP program. All of them focus on educational outreach, including precollege, undergraduate, graduate and community education.

Precollege: Science Education Partnership Award Program-Phase 1 (NIH-NCRR)

We are assembling a suite of experiment modules that can be carried out as an integral part of the middle school life science curriculum. They involve the use of aquatic organisms to investigate basic properties of living systems as well as related biomedical health problems. Because of the focus of this initiative and the collaboration of scientists and educators from the university and the middle school, this is an unique undertaking. It is special because of our intent to provide students with authentic scientific experiences early in their education which focus both on the characteristics of whole organisms, the rudiments of underlying mechanisms that operate in these organisms, and the effects of toxic chemicals on these processes. Facets of the modules include fully described laboratory experiments, video supplements, novel molecular models, and extensive support materials including critically reviewed websites.

Undergraduate: Short Term Training in Toxicology for Minority College Students (NIH-NIEHS)

Several undergraduate minority students chosen from colleges and universities across the country spend eight weeks in the laboratories of Center investigators working on research projects in the area of environmental health. Besides their experience in the laboratory, they participate in a special course in toxicology provided by Center Scientists. In addition, the program includes organized discussions of scientific integrity.

Graduate: Great Lakes Scholars in Environmental Health (CDC-ATSDR)

Graduate students in Nursing at the University of Wisconsin-Milwaukee can elect to enroll in a graduate tutorial in environmental health, in which the students work for a semester with a faculty mentor. Their experience combines learning about environmental health hazards with the opportunity to work on an actual problem with their advisors.

Community: Fish Risk Communication to Ethnic Milwaukee (NIH-NIEHS)

This environmental justice outreach grant is presently concerned with developing scientifically sound, culturally attuned risk communication strategies with the Hmong community centered around the production of a video that addresses the issues related to the consumption of contaminated fish. The key to this initiative is the partnership of scientists and mass communication experts with knowledge of the Hmong population, the Sixteenth Street Community Health Center's Environmental Health Dept., and a leadership group from the Hmong community. Through extensive communication among the partners, we have progressively moved to the point of completing a video about the benefits of eating fish and the attendent hazards of consuming contaminated fish that will be the center piece of an outreach campaign to inform inner city communities about the hazards of eating contaminated fish.

Center in Molecular Toxicology: The Center Associates Program. W. Bradley Hawkins, Center in Molecular Toxicology, Vanderbilt University, 638 RRB, Nashville, TN 37232-0146

The Center Associates Program is a curriculum and professional development program designed for a wide array of individuals in science or a science-related profession. The individuals eligible for the program included faculty from Vanderbilt and other area colleges and universities, community health professionals, high school and elementary teachers, and professionals from governmental and private organizations. This program was designed to provide educational and facility support for the program participants from the Center to perform projects in the area of toxicology, environmental health, or general and specialized science. High school and elementary teachers are able to receive mini-grants and support such as scientific expertise from the Center.

A researcher from a local university and two public schools participated as initial members in the first year the Associates Program and worked on projects such as environmental health testing. After the initial program period, the Center's Outreach Program accepted 11 new groups/individuals to participate in the Center Associates Program for 2001-2002. Community and school educators were primarily recruited. For example, the Cumberland Science Museum in Nashville, a science and health education facility, submitted abstracts to the Associates Program for assistance in helping educate the community on environmental health hazards such as tobacco smoke. Other applicants focused on general support in school science activities such as needs for laboratory equipment for chemistry, toxicology and biology experiments. These projects range from assistance in performing classroom/school health research focusing on Sick Building Syndrome (SBS) to examinations of pGLO bacterial transformations by 8^{th} grade students. For the 2002-2003 an additional 10 proposals were accepted into the program. These proposals have primarily included community groups and K-12 educators. The projects have ranged from providing environmental health curricula programs to area schools, supporting an environmental workshop for students, "Walk to School Nashville," assisting with the development of a physicians environmental network and assisting classrooms with laboratory equipment.

The Associates Program has greatly benefited Outreach Program in a variety of ways. Directly attributed to Associates Program and a host of additional outreach and education activities, the Center's Outreach Program is a major education and research contact for schools and educators in Middle Tennessee. The Associates Program has helped in solidifying and gaining new education contacts in Tennessee and has provided leadership in environmental health issues. It is estimated that over 1500 individuals including school age children from Tennessee will have participated in activities funded through the Center Associate's Program.

Center in Molecular Toxicology: Community Interactions. W. Bradley Hawkins, Center in Molecular Toxicology, Vanderbilt University, 638 RRB, Nashville, TN 37232-0146

The Center in Molecular Toxicology provides information through education and outreach activities for members of the community on environmental health hazards. The goals of the Outreach Program effort are to improve environmental risk perception and to modify individual and population behaviors toward chemical risks. The current and future directions of the Outreach Program focus on identification of specific needs of surrounding communities in order to provide adequate and relevant information in the field of environmental health while translating the Center's research efforts into knowledge that can be applied to public health. To accomplish these goals, the Outreach Program directs its efforts though a series of programs and activities including Center events, K-12 education and professional assistance. Two of these efforts, the Community Forum Series and the Center Associates Program are directly aimed at developing relationships with a variety of community-based organizations.

The Center recognized a need for increased interaction with the surrounding community and developed a seminar series to provide environmental health and science information to the general public. This community forum seminar series focuses upon environmental health issues, in particular those of local and state concern. To promote community interaction, the seminar series was designed to provide ample time for the audience to discuss the topic with the presenters. The community forums are held both on the campus of Vanderbilt University and within the community at locales such as the public library and science museums and have covered a wide range topics. These topics have included cancer and the environment, herbal medicines, environmental exposures and Parkinson's Disease and the genome project. The last two of the forums focused on Tennessee's public health infrastructure including health-tracking networks, bio-terrorism and public health. These forums were brought to the Nashville community through the efforts of the Outreach Program and two community-based organizations: the Tennessee Environmental Council and the Trust for America's Health. By partnering with these groups (and the invited speakers from the American Lung Association, Tennessee and Metropolitan Nashville Departments of Health and the Middle Tennessee Poison Center) lasting relationships were forged. With these groups, several collaborative grants have been written including developing environmental health tracking for the state and to provide environmental health education programs for physicians.

The Center Associates Program is a curriculum and professional development program designed for a wide array of individuals in science or a science-related profession. The individuals eligible for the program included faculty from Vanderbilt and other area colleges and universities, community health professionals, high school and elementary teachers, and professionals from governmental and private organizations. This program was designed to provide educational and facility support for the program participants from the Center to perform projects in the area of toxicology, environmental health, or general and specialized science. High school and elementary teachers are able to receive mini-grants and support such as scientific expertise from the Center.

Of the 20 individuals and groups associated with the program, a variety of community-based groups have applied and received assistance from the program. These include Community Health and Wellness Team, the Tennessee Environmental Council and neighborhood groups. For example, the Outreach Program and Fisk University are seeking to further strengthen the environmental leadership and awareness of community and neighborhood leaders, through a program for Building Environmental Stewardship/ Sustainability and Community Toxics Awareness. This program will demonstrate the use of the computer based learning modules, the internet, video, and geographical information systems which offer a vast storehouse of information. It will be shown that these tools can be very useful in empowering the residents of communities to have a more effective voice in addressing key environmental issues and protecting the environmental health of their families.

Environmental Health Sciences Center at Wayne State University
Community Outreach and Education Program
Dr. Mary Dereski, Director

COEP Mission Statement: To educate the COEP target audience about Environmental Health issues and preventative measures with particular emphasis on EHS Center member research.

COEP Objectives:

1. Education: Translate center member research information into knowledge applied to science education and public health
2. Prevention: Focus on community education about reducing environmental disease risk and/or hazard exposure
3. Resources: establish and maintain resource programs for the dissemination of environmental health information and educational materials

Target Audience: Consists of K-12 educators and students and members of established community based organizations. Locally the COEP's target audience is the five county area around and including the city of Detroit. The COEP has also traveled state wide and nationwide to give presentations and hold workshops.

Educational Programs for Students and Teachers

1. Environmental Cyber Schoolhouse

The Environmental Cyber Schoolhouse is a WWW consists of two web based interactive, multimedia environmental health units geared toward 9TH through 12TH grade students. The goal of the web-based curriculum is to increase the students understanding of how basic research in environmental toxicology provides information necessary to identify risk factors and safeguard human health. To date, 100 teachers have been trained, and 885 students have utilized the Health Quest.

2. Biotechnology

Workshops to date (2001-2002) have included DNA and protein gel electrophoresis, transformation of E. coli, determination of enzyme activity, Radioimmunodiffusion, ELISA, and PCR. These workshops have been held throughout the metropolitan Detroit area. New laboratory experiments have been tested and tried during the summer of 2002 and will be incorporated into new workshops during the coming academic year. To date, 157 teachers and 71 students have attended workshops.

Community Based Programs

1. Environmental Cyber Schoolhouse

Interest within the community was high with regard to obtaining web-based information on lead poisoning and asthma. Therefore, a portal was created into the Health Quest unit of the Environmental Cyber Schoolhouse that would allow access to the informational pages for community members (guests). Several community groups including the Health Department of Detroit use the site frequently for educational purposes.

2. Healthy Homes=Healthy Kids

The COEP partnered with the City of Detroit Head Start Program and a local community based organization (Healthy Homes=Healthy Kids, Detroit Project) to develop a poster and written fact sheets that focus on indoor environmental health issues. Along with developing a full color poster and six fact sheets, the materials were also translated into Spanish and Arabic. In a new collaboration with students from the School of Medicine at WSU, a training manual has recently been developed. A limited number of copies of the training manual will be assembled and will be made available to the staff of head start and other interested community based organizations. The poster and fact sheet are available online.

Environmental Health Sciences Center
Wayne State University
Community Outreach and Education Program
Dr. Mary Dereski-Director

Biotechnology Workshops

Abstract

Although biotechnology is in the news more and more each day, awareness of this relatively new branch of science remains limited. This is especially true for students taking science courses at the high school and community college level. The COEP has developed a series of workshops in biotechnology that introduces high school students, teachers and community college students to the basic concepts and technologies involved in biotechnology.

The goals of these Biotechnology workshops are as follows:

1. Expand and enhance opportunities for high school teachers/students to study and use biotechnology.
2. Introduce high school teachers/students to the techniques and skills that are necessary to work in biotechnology related careers.
3. Increase teacher/students' awareness of the impact biotechnology will have on their own lives and society in general.

Workshops to date have included DNA and protein gel electrophoresis, transformation of E. coli, determination of enzyme activity, Radioimmunodiffusion, ELISA, and PCR. These workshops have been held throughout the metropolitan Detroit area. Dr. Kim Woodcroft of the Imaging and Cytometry Core was instrumental in attending several of the workshops and offering connections to the EHS Center member research. New laboratories have been tested and tried during the summer of 2002 and will be incorporated into new workshops during the coming academic year 2003.

Dr. Dereski is also offering a Biotechnology for High School Teachers Graduate class online (3 credits) in the fall of 2002. The topics such as Environmental Genomics and Bioinformatics will be presented in the lecture with accompanying laboratory activities during the sixteen-week course.

Dr. Dereski is also developing a course for students at a local community college that will be offered in the spring of 2003. This course will be part of a biotechnology course schedule that will contain course that is transferable to WSU for completion of a Bachelor's degree in Molecular Biology.